CLAIM AMENDMENTS

1. (Amended) A method for the detection of evidence on a surface at a crime scene that is an intrinsically fluorescent biological material containing naturally-occurring biological fluorophores selected from the group consisting of blood, saliva, semen, skin oil and urine by detection of the appropriate fluorescence emission signals arising from each material from which background, reflectance and scattering have been subtracted and ~~differentiation~~ distinguishing between these biological evidentiary ~~material~~ materials comprising:

   a. exciting at least one intrinsic biological fluorophore arising from components of blood, saliva, semen, skin oil or urine having a specific excitation range of electromagnetic radiation wavelength above 200 nm; whereby said intrinsic fluorophore in the biological material is excited to emit fluorescence; and

   b. detecting the emission fluorescence signal intensities associated with the minima and maxima of the intrinsic fluorescence arising from the excited fluorophores; and

   c. determining ~~detecting~~ the intensities in the fluorescence signals arising from the background ~~intensities~~ at the minima and maxima of the intrinsic fluorescence by detecting the fluorescence signal intensities at these energies in the absence of excitation light; ~~excitation;~~ and

   d. calculating the intensities of the reflectance and scattering at the maxima of the fluorescence from the intensities of the background-subtracted ~~minima with an appropriate algorithm;~~ minima; and

e. subtracting the calculated reflected and scattered signal intensities and measured background intensities from the detected signals of the biological fluorescence; thereby determining the ~~amount~~ presence of material by the ~~magnitude~~ presence of the detected fluorescence in the appropriate emission regions from which background, reflectance, and scattering contributions have been ~~subtracted~~. subtracted; and

f. distinguishing between the biological material through the requirements that:

i. the appropriate fluorescence emission signals are detected for the biological material; and

ii. the ratios of the magnitude of background, scattering, and reflectance-corrected fluorescence signals lie within expected ranges.

~~2.~~ (Withdrawn) ~~The method as set forth in Claim 1, wherein the ratios of multiple fluorescence signal intensities, from which measured background and calculated reflectance and scattering have been subtracted, are determined; whereby the differentiation between the biological material depends upon the requirement that the ratios of the background, scattering, and reflectance corrected fluorescence signals lie within specified ranges and that the amount of material is determined by the magnitude of said detected signals the ratios of which lie within said expected ranges.~~

3. (Amended) The method as set forth in Claim 1, wherein said biological intrinsic fluorescence emission ranges are selected from the following groups for the associated biological material: ~~group fluorescing in the 320-360, 380-460, 430-480, 420-510, 430-540, 480-570, 630-700, 760-840 and 860-930 nm regions.~~

a. the 320 – 360 nm emission region upon excitation with energies in the 250 – 300 nm region and the 630 – 700 nm emission region upon excitation with energies in the 570 – 590 nm region for the detection of blood; and

b. the 320 – 360 nm emission region upon excitation with energies in the 250 – 300 nm region, and the 630 – 700 nm region upon excitation with energies in the 520 – 540 nm region and the 570 – 590 nm region for the detection of saliva; and

c. the 320 – 360 nm emission region upon excitation with energies in the 250 – 300 nm region, the 430 – 480 nm emission region upon excitation with energies in the 250 – 290 nm region, the 420 – 510 nm emission region upon excitation with energies in the 360 – 390 nm region, the 430 – 540 nm emission region upon excitation with energies in the 390 – 410 nm region, the 480 – 570 nm emission region upon excitation with energies in the 430 – 470 nm region, and the 860 – 930 nm emission region upon excitation with energies in the 790 – 810 nm region for the detection of semen; and

d. the 320 – 360 nm emission region upon excitation with energies in the 250 – 300 nm region, and the 630 – 700 nm region upon excitation with energy in the 520 – 540 nm region for the detection of skin oil; and

e. the 320 – 360 nm emission region upon excitation with energies in the 250 – 300 nm region, the 380 – 460 nm emission region upon excitation with energies in the 250 – 300 nm region, the 420 – 510 nm emission region upon excitation with energies in the 360 – 390 nm region, the 430 – 540 nm emission region upon excitation with energies in the 390 – 410 nm region, the 480 – 570 nm emission region upon excitation with energies in the 430 – 470 nm region, and the 760 –

840 nm emission region upon excitation with energies in the 640 – 680 nm region for the detection of urine.

4. (Withdrawn) A method for the detection and differentiation of biological material comprising:

   a. exciting multiple intrinsic biological fluorophores with ultraviolet electromagnetic radiation having excitation wavelengths between 200 and 300 nm, whereby intrinsic fluorophores in any biological material present are excited to emit fluorescence, some of which is self-absorbed to excite other intrinsic fluorophores that in turn emit fluorescence; and

   b. detecting the fluorescence signal intensities associated with the minima and maxima of the intrinsic fluorescence; and

   c. detecting the background intensities at the minima and maxima of the intrinsic fluorescence in the absence of excitation; and

   d. calculating the intensities of the reflectance and scattering at the maxima of the fluorescence from the intensities of the background-subtracted minima with an appropriate algorithm; and

   e. subtracting the calculated reflected and scattered signal intensities and measured background signal intensities from the detected signals of the biological fluorescence; and

   f. determining that the ratios of the detected fluorescence signals from which background, reflectance, and scattering contributions have been subtracted lie within expected ranges, thereby determining the amount of biological material by the magnitude of the detected fluorescence signals from which background,

reflectance, and scattering contributions have been subtracted the ratios of which lie within expected ranges.

5. (Withdrawn) The method as set forth in Claim 4, wherein the intrinsic biological fluorophores of said biological intrinsic fluorescence are selected from the group fluorescing in the 320-360, 380-460, 430-480, 420-510, 430-540, 480-570, 630-700, 760-840 and 860-930 nm regions.
6. (Withdrawn) The method as set forth in Claim 4, wherein secondary-excited intrinsic fluorescence includes the 430-480, 420-510, 430-540, 480-570, 630-700, 760-840 and 860-930 nm regions, and the like.
7. (Withdrawn) A method for the detection, differentiation and imaging of biological material comprising:
    a. exciting at least one intrinsic biological fluorophore having a specific excitation range of electromagnetic radiation wavelength above 200 nm; whereby said intrinsic fluorophore in the biological material is excited to emit fluorescence; and
    b. detecting and imaging the signal intensities associated with the expected maximum emission ranges of the intrinsic fluorescence of the biological material in question; and
    c. imaging the substrate background with ambient light, reflected excitation radiation and scattered excitation light at wavelengths at least 50 nm above the highest expected emission wavelength range of the intrinsic fluorescence; and
    d. combining the output images of the intrinsic fluorescence emission ranges and the substrate surface from ambient light, reflected excitation radiation and scattered excitation light at wavelengths at least 50 nm above the highest expected emission

wavelength range of the intrinsic fluorescence; thereby detecting the biological material by the presence of lower wavelength images upon higher wavelength substrate surface image; and

e. differentiating between biological material samples by requiring that the ratios of detected intrinsic fluorescence emissions fall within expected ranges, and determining the amount of material by the magnitude of the detected fluorescence.

8. (Withdrawn) Apparatus for the detection of biological material on a non-living surface comprising:

a. means for directing electromagnetic radiation towards the sample, said means adapted to emit radiation at energies capable of exciting at least one intrinsic biological fluorophore;

b. at least one detector for electromagnetic radiation capable of converting the emitted, or reflected and scattered radiation into electrical signals, said detector adapted to detect electromagnetic radiation at wavelengths above 320 nm to detect the minima and maxima associated with the fluorescence emission of said intrinsic biological fluorophores; and

c. means for analyzing the electrical signals corresponding to the fluorescence of the intrinsic fluorophores, and the reflected and scattered excitation intensities to determine the presence of biological material.

9. (Withdrawn) The apparatus as defined in Claim 8, wherein the electromagnetic waves are directed towards the substrate surface in time-modulated pulses.

10. (Withdrawn) The apparatus defined in Claim 8, wherein the means for directing electromagnetic radiation includes means for time-modulating the electromagnetic radiation.

11. (Withdrawn) The apparatus defined in Claim 8, wherein the means for directing electromagnetic radiation includes means for sequentially directing the electromagnetic radiation towards the sample surface.